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United States Patent [19]

Ostrow

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[54] **ELECTROPHORETIC CUFF APPARATUS
DRUG DELIVERY SYSTEM**5,037,380 8/1991 Jacobsen et al. .
5,823,989 10/1998 Ostrow .

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193480 9/1986 European Pat. Off. .

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Attorney, Agent, or Firm—Edward Langer[57] **ABSTRACT**

A flexible cuff for wrapping around a part of a limb, that is comprised of multiple biosensing patch units of a required size and shape to fit the body contour for applying to an area of skin. The cuff has an array of flexible porous (polymer) electrodes held at constant potential with alternating polarities. A network of supply tubes connected to an external liquid reservoir provides a slow supply of medicated fluid to each electrode. A pump/titration regulator is in communication with the transdermal electrode to regulate permeant flow to the skin. An electric and an electromagnetic field applied through the cuff then causes the drug to be rapidly absorbed throughout the skin. The electrodes within the cuff, or the applicator pads which it is comprised of, can be additionally used for applying electromagnetic, Transcutaneous Nerve Stimulation, and for Electrical Muscle Stimulation. Alternatively, the cuff can be used to assist rehabilitation exercise therapy conditioning in combination with Electrical Muscle Stimulation.

Related U.S. Application Data

[63] Continuation-in-part of application No. 08/636,406, Apr. 23, 1996, Pat. No. 5,823,989

[60] Provisional application No. 60/049,446, Jun. 12, 1997.

[30] **Foreign Application Priority Data**

Apr. 23, 1995 [IL] Israel 113459

[51] Int. Cl.⁶ A61N 1/30[52] U.S. Cl. 604/20; 604/67; 607/148;
607/149; 607/152; 607/153[58] Field of Search 604/20–21, 67;
607/152–153, 148–149[56] **References Cited**

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20 Claims, 6 Drawing Sheets